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SIDS ROBUST SUMMARIES
FOR 1,2,3-TRINITROGLYCERIN
(CASRN: 55-63-0)

TWO FOLDERS

- TNG FINAL SUMMARIES (41)
- TNG RECAP TEST RESULTS (1)

SYNTHETIC ORGANIC CHEMICALS MFG. ASSN.
(SOCMA)

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SOCMA_TNG_LABELS

1,2,3, -TRINITROGLYCERIN (TNG)
CAS RN: 55-63-0
SUMMARY OF SIDS RESULTS

<u>SIDS SEGMENT / TEST</u>		<u>SPECIES</u>	<u>PROTOCOL</u>	<u>RESULTS</u>
<u>PHYSICAL-CHEMICAL</u>				
<u>1</u>	<u>Melting Point (°C)</u>	--	--	2.3 ; 13.0
<u>2</u>	<u>Boiling Point (°C)</u>	--	--	Inert atmosphere : ~ 240 (calc'd) Air: Decomposes = 70
<u>3</u>	<u>Vapor Pressure (kPa)</u>	--	--	$20^{\circ}\text{C} = 3.6 \times 10^{-5}$; $40^{\circ}\text{C} = 3.3 \times 10^{-4}$: $60^{\circ}\text{C} = 2.3 \times 10^{-3}$ (Best represent. values)
<u>4</u>	<u>Partition Coefficient</u>	--	--	1.62 – 2.35
<u>5</u>	<u>Water Solubility (g/L)</u>	--	--	$20^{\circ}\text{C} = 1.38 - 2.0$; $40^{\circ}\text{C} = 1.68$ $60^{\circ}\text{C} = 1.96 - 2.5$; $80^{\circ}\text{C} = 3.44$
<u>ENVIRONMENTAL</u>				
<u>6</u>	<u>Photodegradation (t_{1/2}; days)</u>	--	Footnote 1	Distilled water = 116 Municipal pond H ₂ O = 57 H ₂ O downriver from plant = 73
<u>7</u>	<u>Water Stability (t_{1/2}, days)</u>	--	--	pH 9 @ 25 °C = 37; pH 5 @ 25 °C = 8575 ² ; pH 3 @ 37 °C = ">3650".
<u>8</u>	<u>Fugacity</u>	--	EQC software	Predominantly water & soil ³ .
<u>9</u>	<u>Biodegradation</u>	Indigenous microorganisms downriver from plant	Footnote 1	1 st Order rate const 0.6/hr. – 8.6 x 10 ⁻² /hr 2 nd Order constant 1.06 – 1.43 x 10 ⁻⁹ ml/cell/hr
<u>9</u>	<u>Biodegradation</u>	Sewage microorganisms	Footnote 1	90-100 % metabolism to DNG & MNG
<u>ECOTOXICOLOGY</u>				
<u>10</u>	<u>96 hr. LC₅₀</u>	Rainbow trout	ASTM E729-80	1.90 mg / L
<u>10</u>	"	F'head Minnow	"	3.58 mg / L
<u>10A</u>	<u>8 day dietary LD₅₀</u>	Quail c. virginianus	Same as OECD No. 205	>5620 ppm; LOAEL = 5620 ppm; NOAEL = 3160 ppm.
<u>11</u>	<u>96 hr. EC₅₀</u>	Alga S. capricornutum	EPA 797.1060	1.15 mg / L
<u>12</u>	<u>48 hr. LC₅₀</u>	Daph. C. dubia	ASTM E729-80	17.83 mg / L
<u>HEALTH</u>				
<u>13</u>	<u>Acute oral LD₅₀</u>	Mouse	Footnote 1	M: 1,188 mg / kg (95% C.L.= 1008-1352). F: 1055 mg / kg (95% C.L. = 895 - 1178)
<u>13</u>	<u>Acute oral LD₅₀</u>	Rat	16 CFR 1500.3 (c)(2)(I) [FHSA]	685 (95% CL=510 – 940) mg / kg
<u>13</u>	<u>I.V. MLD</u>	Rabbit	Footnote 1	45 mg / kg
<u>13</u>	<u>Dermal LD₅₀</u>	Rabbit	Footnote 1	>9,560 mg / kg
<u>13</u>	<u>Inhalation LD₅₀</u>	--	--	Not performed. Too dangerous
<u>13</u>	<u>Skin irritation</u>	Rabbit	16CFR1500.41 (FHSA)	Primary Irritation Index = 0.90

<u>13</u>	<u>Eye irritation</u>	<u>Rabbit</u>	<u>16CFR 1500.42 (FHSA)</u>	<u>Very mild conjunctival irritation</u>
<u>13</u>	<u>Skin sensitization</u>	<u>Guinea pig</u>	<u>Kligman Maximization</u>	<u>4 / 10 sensitized</u>
<u>13A</u>	<u>Skin sensitization</u>	<u>Humans</u>	<u>Clinical study</u>	<u>Of ~6200 cases occupat'l dermatitis seen at Finnish gov't. OSH clinic, only 4 were confirmed due to TNG</u>
GENETIC TOXICITY IN VIVO				
<u>14</u>	<u>Dominant Lethal (diet)</u>	<u>Rat</u>	<u>~Same as OECD #478</u>	<u>No effect at maximum test level. (1.0 % in diet for 13 weeks)</u>
<u>14</u>	<u>Chromosome aber- rations (diet)</u>	<u>M & F Rats (kidney cells)</u>	<u>~Same as OECD #475</u>	<u>No apparent effect @ ~230 mg/kg for eight weeks.</u>
<u>14</u>	<u>Chromosome aber- rations (diet)</u>	<u>M & F Rats (lymphocytes)</u>	<u>~Same as OECD #475</u>	<u>No apparent effect @ ~230 mg/kg for eight weeks.</u>
<u>14</u>	<u>Chromosome aber- rations (diet)</u>	<u>M & F Rats (bone marrow)</u>	<u>~Same as OECD # 475</u>	<u>No apparent effect @ 360 mg/kg (M) or 430 mg/kg (F) for 2 years.</u>
<u>14</u>	<u>Chromosome aber- rations (diet)</u>	<u>M & F Rats (kidney cells)</u>	<u>~Same as OECD # 475</u>	<u>No apparent effect @ 360 mg/kg (M) or 430 mg/kg (F) for 2 years.</u>
<u>14</u>	<u>Chromosome aber- rations (oral capsule)</u>	<u>M & F Dogs (kidney cells)</u>	<u>~Same as OECD # 475</u>	<u>No apparent effect @ 5 mg/kg for eight weeks.</u>
<u>14</u>	<u>Chromosome aber- rations (oral capsule)</u>	<u>M & F Dogs (lymphocytes)</u>	<u>~Same as OECD # 475</u>	<u>No apparent effect @ 5 mg/kg for eight weeks.</u>
GENETIC TOXICITY IN VITRO				
<u>15</u>	CHO-K1 cells	<u>Chinese hamster (K-1 cells)</u>	<u>~Same as OECD #476</u>	<u>No mutagenic effects.</u>
<u>15</u>	<u>Ames (TNG in DMSO; 1980)</u>	<u>S. typhimurium mutants</u>	<u>~Same as OECD #471</u>	<u>Active in TA 1537 @ 1mg a.i. / plate.</u>
<u>15</u>	<u>Ames (TNG in Ethanol)</u>	<u>S. typhimurium mutants</u>	<u>~Same as OECD #471</u>	<u>Active in TA 1535 @ 0.5 & 1.5 mg / plate .</u>
<u>15</u>	<u>Ames (TNG ad- sorbed on lactose. Suspended in DMSO; 1975)</u>	<u>S. typhimurium mutants</u>	<u>~Same as OECD #471</u>	<u>Active in TA 1535 @ 0.75 & 1.0 mg / plate</u>
REPEATED DOSE TOXICITY				
<u>16</u>	<u>1 Yr. Oral Capsule</u>	<u>M & F Beagle dog</u>	<u>~Same as OECD #452</u>	<u>Methemoglobin formation in M & F at lowest dose (1 mg / kg).</u>
<u>16</u>	<u>2 Yr. Diet</u>	<u>M & F Rat</u>	<u>~Same as OECD #452</u>	<u>Increased foci of hepatocellular alteration (both sexes). Spleen hyperpigmentation Interstitial cell tumors (male testes). Kidney epithelial</u>

				hyperpigment'n Multiple blood chem. changes Incr. liver neoplastic nodules and Hepatocellular carcinomas NOAEL: M = 3.04 mg TNG/kg/day F = 3.99 mg/kg TNG/day <u>TD₅₀</u> ⁵ M, mixed liver = 221 mg/kg/day M, Testic. interst.=405 mg/kg/day F, mixed liver = 329 mg/kg/day
<u>16</u>	<u>2 Yr. Diet</u>	<u>M & F Mouse</u>	<u>~Same as OECD</u> #452	<u>Decr. food intake & wt. gain;</u> <u>behavioral effects; metHb</u> <u>format'n.</u> NOAEL: M = 114.6 mg / kg /day F = 96.4 mg / kg / day
<u>17</u>	<u>3-Gen.</u> <u>Reproduction</u>	<u>Rat</u>	<u>U.S. FDA</u> <u>(1966)</u>	<u>Aspermatogenesis in F_{2a}</u> <u>males</u> ⁴ . Decr. food intake in F _{1b} Females ⁴ . Reduced total litter wt. (F _{1b}) ⁴ . NOAEL: M = 39 mg/kg/day F = 46 mg / kg / day
<u>18</u>	<u>Teratogenicity</u>	<u>Rat</u>	<u>U.S. FDA</u> <u>(1966)</u>	<u>Decr. b.wt., high dose.</u> Incr. diaphrag. hernias, high dose Decr. hyoid bone ossific, high dose
<u>SPECIAL</u>	<u>Methemoglobinemia</u> <u>protection / antidote</u>	<u>M & F Beagle</u> <u>dog</u>	<u>Footnote 1</u>	<u>Methylene blue depresses</u> <u>MetHb formation; does not</u> <u>hasten removal.</u>

1. Investigator's procedure. See Robust Summary.
2. Calculation by Robust Summary author, based on $t_{1/2} = 134$ days @ 85°C. Assumes reaction rate halves for every 10°C drop in temperature.
3. Level III values in water and soil lower than Level II values. Amounts of decrease vary depending on effects of water pH, photolysis, and biodegradation.
4. At 1% dietary dose.
5. TD₅₀ (50% tumor dose); see Gold & Zeiger (1997).